

**Shenzhen Lxc Electronics Technology Co ., Ltd**

**深圳市连兴创电子科技有限公司**

**APPROVAL SHEET**

**For**

**深圳市易捷通科技有限公司**

**4G 天线 project**

**Antenna componentst**

|                      |                                     |
|----------------------|-------------------------------------|
| 频率范围 Frequency range | GSM:824-960 (MHz) , 1710-2690 (MHz) |
| 驻波比系数 VSWR           | <4.0                                |
| 输入阻抗 Input Impedance | 50 ( Ω )                            |
| 极化方式 Polarization    | 垂直极化 Vertical Polarization          |
| 半功率波束 (3dB) HPW      | 180° H-plane 120° E-plane           |

|                         |  |                   |  |
|-------------------------|--|-------------------|--|
| <b>RF by</b>            |  | <b>Checked by</b> |  |
| <b>ME by</b>            |  | <b>Date</b>       |  |
| <b>Customer Confirm</b> |  |                   |  |

|                                                                                                                         |           |              |                                       |
|-------------------------------------------------------------------------------------------------------------------------|-----------|--------------|---------------------------------------|
| Project:4G 天线                                                                                                           |           | Author:Wang  | File Name:<br><br><b>4G 天线-APP-RA</b> |
| Date: 2020-7-15                                                                                                         |           |              |                                       |
| TEST:                                                                                                                   | Language: | Check: Zhong |                                       |
| A                                                                                                                       | English   |              |                                       |
|                                                                                                                         |           |              |                                       |
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## Revision History

| Date      | Revision | Description of Changes |
|-----------|----------|------------------------|
| 2020-7-15 | RA       | Measured with sample.  |

|                                          |          |
|------------------------------------------|----------|
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# 1 Technical Summary

This report summarizes the electrical results of the proposed antenna to support the 4G 天线 program. We test the antenna with the latest version handset. And it seems to be acceptable.

## 2 General Description

### 2.1 Components/Part revisions

VSWR: Voltage Standing Wave Rate.

## 3 Mechanical Description

## 4 Electrical Performance

### 4.1 Set-up

#### 4.1.1 VSWR

VSWR measurements (S11) were performed using an Agilent 8753D Network Analyzer and the previously described test fixture. Coaxial chokes were used to mitigate surface currents on the outside of the cabling. The testing was performed in free space.

#### 4.1.2 Gain & Radiation Patterns

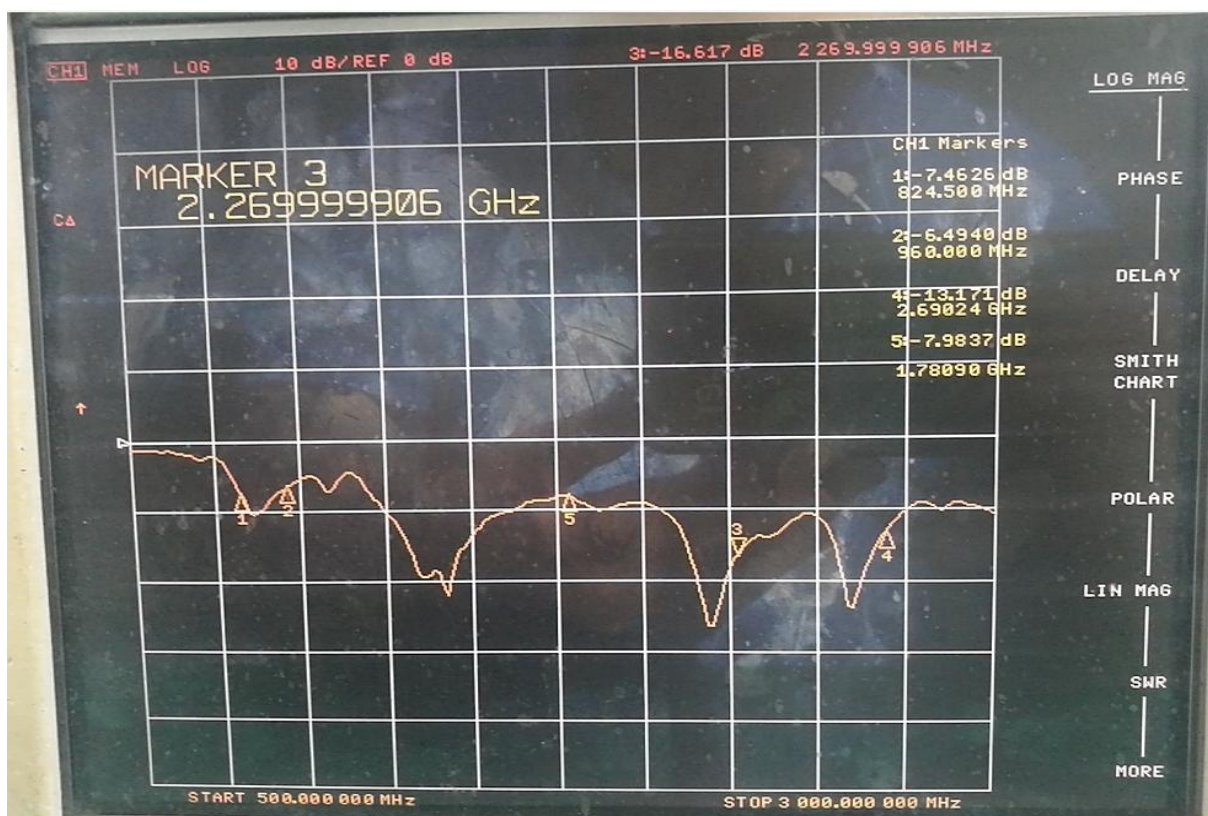
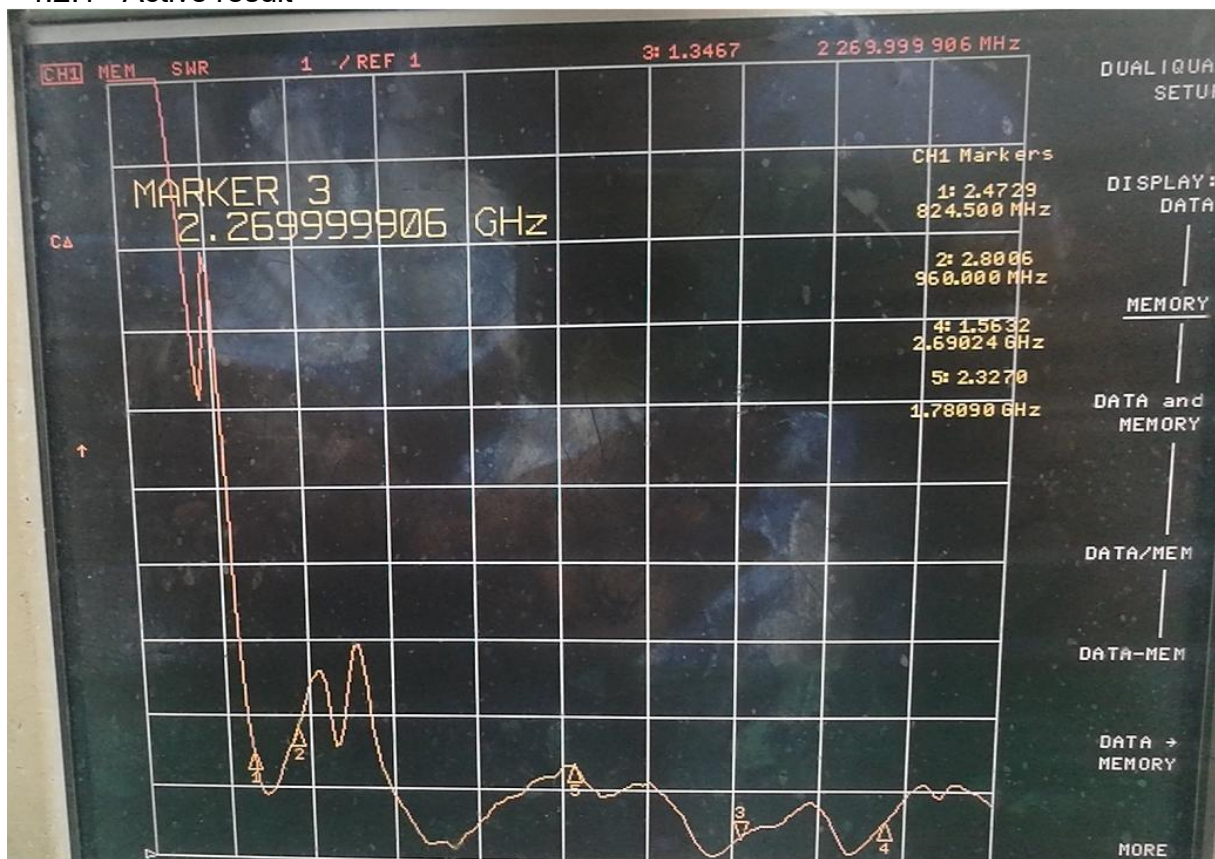
The gain of the antenna was measured in the Lxc's anechoic chamber. Coaxial chokes on the feed cable were used to mitigate surface currents. The chamber provides less than -30 dB reflectivity from 800 MHz through 3 GHz and an 18" diameter spherical quiet zone. The measurement results are calibrated using both dipole and leaky wave horn standards.

#### 4.1.3 Matching Circuit Description

|                                                                                                                         |           |              |                                       |
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## 4.2 Measurement Data

### 4.2.1 Active result



|                                                                                                                         |           |              |                                       |
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## 效率与增益

| Passive Test For GSM |          |            | Passive Test For D3 |          |            | Passive Test For D4 |          |            | Passive Test For D5 |          |            |
|----------------------|----------|------------|---------------------|----------|------------|---------------------|----------|------------|---------------------|----------|------------|
| Freq (MHz)           | Effi (%) | Gain (dBi) | Freq (MHz)          | Effi (%) | Gain (dBi) | Freq (MHz)          | Effi (%) | Gain (dBi) | Freq (MHz)          | Effi (%) | Gain (dBi) |
| 824                  | 17.41    | -2.14      | 1710                | 31.46    | 3.73       | 2110                | 29.29    | 1.53       | 2450                | 34.38    | 2.56       |
| 832                  | 19.37    | -1.49      | 1750                | 26.76    | 2.52       | 2120                | 31.31    | 1.66       | 2460                | 33.51    | 2.22       |
| 840                  | 23.18    | -1.24      | 1800                | 24.89    | 0.5        | 2130                | 35.09    | 1.96       | 2470                | 34.3     | 1.78       |
| 848                  | 27.8     | -0.72      | 1850                | 25.35    | 0.22       | 2140                | 39.32    | 2.04       | 2480                | 35.85    | 1.84       |
| 856                  | 29.86    | -0.71      | 1900                | 30.85    | 1.68       | 2150                | 38.63    | 1.95       | 2490                | 40.49    | 2.11       |
| 864                  | 26.88    | -0.95      | 1950                | 34.75    | 2.66       | 2160                | 36.18    | 2.19       | 2500                | 40.29    | 2.04       |
| 872                  | 26.94    | -0.67      | 1960                | 33.64    | 2.49       | 2170                | 35.52    | 2.6        | 2510                | 37.01    | 2.03       |
| 880                  | 25.59    | -0.76      | 1970                | 30.91    | 2.17       | 2180                | 36.52    | 2.44       | 2520                | 37.31    | 1.99       |
| 888                  | 26.62    | -0.63      | 1980                | 26.61    | 1.74       | 2190                | 44.25    | 3.32       | 2530                | 34.9     | 1.28       |
| 896                  | 27.89    | -0.47      | 1990                | 25.62    | 1.48       | 2300                | 42.93    | 3.13       | 2540                | 31.14    | 0.59       |
| 904                  | 29.46    | -0.29      | 2000                | 27.5     | 1.51       | 2310                | 39.67    | 2.81       | 2550                | 26.44    | -0.15      |
| 912                  | 34.22    | 0.24       | 2010                | 29.71    | 1.54       | 2320                | 36.35    | 2.47       | 2560                | 22.3     | -0.58      |
| 920                  | 36.18    | 0.31       | 2020                | 28.2     | 1.11       | 2330                | 33.33    | 1.86       | 2570                | 20.8     | -0.85      |
| 928                  | 36.24    | 0.29       |                     |          |            | 2340                | 35.97    | 1.98       | 2580                | 21.03    | -0.94      |
| 936                  | 35.59    | 0.1        |                     |          |            | 2350                | 34.05    | 1.96       | 2590                | 21.6     | -0.81      |
| 944                  | 34.38    | -0.27      |                     |          |            | 2360                | 32.11    | 1.87       | 2600                | 25.33    | -0.49      |
| 952                  | 31.43    | -0.58      |                     |          |            | 2370                | 34.68    | 2.32       | 2610                | 29.17    | -0.06      |
| 960                  | 28.36    | -0.48      |                     |          |            | 2380                | 37.29    | 2.65       | 2620                | 29.34    | -0.19      |
|                      |          |            |                     |          |            | 2390                | 41.54    | 3.4        | 2630                | 32.08    | 0.3        |
|                      |          |            |                     |          |            | 2400                | 48.77    | 4.01       | 2640                | 35.23    | 0.54       |
|                      |          |            |                     |          |            | 2410                | 48.6     | 4.05       | 2650                | 35.75    | 0.66       |
|                      |          |            |                     |          |            | 2420                | 45.24    | 3.87       | 2660                | 37.52    | 0.65       |
|                      |          |            |                     |          |            | 2430                | 39.22    | 3.36       | 2670                | 37.73    | 0.58       |
|                      |          |            |                     |          |            | 2440                | 32.69    | 2.59       | 2680                | 38.31    | 0.89       |
|                      |          |            |                     |          |            |                     |          |            | 2690                | 38.66    | 1.21       |

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|                                                                                                                         |           |              |                                       |
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| SMA        |             | Company: 6 P |  | Date: |  |
|------------|-------------|--------------|--|-------|--|
| 41.0 ± 1.0 | 153.0 ± 1.0 | φ            |  |       |  |
| SMA公头母针    |             |              |  |       |  |

| SMA        |             | Company: 6 P |  | Date: |  |
|------------|-------------|--------------|--|-------|--|
| 41.0 ± 1.0 | 153.0 ± 1.0 | φ            |  |       |  |
| SMA公头母针    |             |              |  |       |  |

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## 7 Reliability tests

### 7.1 Test content

| No | 试验项目   | 试验方法              | 判定基准                          |
|----|--------|-------------------|-------------------------------|
| 1  | 盐水喷雾试验 | 把盐浓度 5%的溶液喷雾 48HR | 不能有变色, 歪 (变形) 脱落等的缺点 腐蚀面积不能过大 |
|    |        |                   |                               |

### 7.2 Test results

| NO | 样品数 | 试验期间  | 实验结果 | 备注                    |
|----|-----|-------|------|-----------------------|
| 1  | 50  | 24 小时 | OK   | 技术等级为 9 级<br>腐蚀<0.4mm |
| 2  | 50  | 48 小时 | OK   | 技术等级为 9 级<br>腐蚀<0.4mm |

## 8 Conclusion

From the above test results, we can know the electrical performance of the antenna is seems good.

Shenzhen Lxc Electronics Technology Co ., Ltd ,look forward to your confirmation, thank you for your cooperation !

|                                                                                                                         |           |              |                                       |
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